

CLAIMS

What is claimed is:

1. A solenoid fluid control valve, comprising:

a fluid control body adapted for being received in a fluid housing, said fluid control body including a central cavity, and having a pressure supply passage at a first end and a radially extending pressure control passage;

a feed supply tube positioned in said central cavity, said feed supply tube including an outer diameter in communication with the pressure control passage, and including an inner bore operably connected to said pressure supply passage, said feed supply tube being supported in said central cavity of said fluid control body by way of a radially and axially extending wall, said wall being segmented into a plurality of longitudinally extending flow chambers, said feed supply tube including a valve receiving chamber area;

a valve seat portion being made of a metallic material and press fit into said fluid control body, said valve seat portion including a valve seat and a passage in communication between said valve seat and said pressure control passage;

a valve contained in said valve receiving chamber operable to selectively close off communication between said pressure supply passage and said pressure control passage; and

a solenoid for opening said valve in response to a signal.

2. The invention according to claim 1, wherein said solenoid includes a central axis and has a coil wound around a bobbin, spaced from and positioned around said central axis, said coil having radially stepped radial inner diameters.
3. The invention according to claim 2, further comprising a casing member for attaching said solenoid to said fluid control body; a portion of said casing member extending into the stepped portion of said coil for forming a flux tube therein.
4. The invention according to claim 3, further comprising an armature axially movable within said bobbin.
5. The invention according to claim 4, further comprising a pole piece assembly adjacent said armature and interposed between said bobbin and said fluid control body.
6. The invention according to claim 5, further comprising a control rod extending along said central axis and through said pole piece assembly for opening of said valve, said control rod including a tapered end.
7. The invention according to claim 1, wherein the fluid supply passage is a radially extending passage and said fluid control passage is axially extending.

8. The invention according to claim 1, wherein said valve is a ball valve.
9. The invention according to claim 5, wherein said pole piece assembly includes a stamped flux washer member and a press-fit valve seat member.
10. The invention according to claim 2, wherein said bobbin and said coil member are over molded in an integral unit with a connector member.
11. The invention according to claim 4, wherein a cage is formed for retaining the armature therein.
12. The invention according to claim 1, wherein said fluid control body is made of a polymer material.
13. The invention according to claim 1, wherein said fluid control body has an upper radially extending lip member and at least one axially protruding positioning rib extending therefrom.
14. The invention according to claim 1, wherein said fluid control body has a performance curve progression of any of those depicted in any of Figures 9-11.

15. A solenoid fluid control valve, comprising:

a fluid control body adapted for being received in a fluid housing, said fluid control body including a central cavity, and having a pressure supply passage at a first end and a radially extending pressure control passage;

a feed supply tube positioned in said central cavity, said feed supply tube including an outer diameter in communication with the pressure control passage, and including an inner bore operably connected to said pressure supply passage, said feed supply tube being supported in said central cavity of said fluid control body by way of a radially and axially extending wall, said wall being segmented into a plurality of longitudinally extending flow chambers, said feed supply tube including a valve receiving chamber area;

a valve seat portion being made of a metallic material and press fit into said fluid control body, said valve seat portion including a valve seat and a passage in communication between said valve seat and said pressure control passage;

a valve contained in said valve receiving chamber operable to selectively close off communication between said pressure supply passage and said pressure control passage;

a solenoid for opening said valve in response to a signal, wherein said solenoid includes a central axis and has a coil wound around a bobbin, spaced from and positioned around said central axis, said coil having radially stepped radial inner diameters;

a casing member for attaching said solenoid to said fluid control body; a portion of said casing member extending into the stepped portion of said coil for forming a flux tube therein; and

an armature axially movable within said bobbin.

16. The invention according to claim 15, further comprising a pole piece assembly adjacent said armature and interposed between said bobbin and said fluid control body.

17. The invention according to claim 16, further comprising a control rod extending along said central axis and through said pole piece assembly for opening of said valve, said control rod including a tapered end.

18. The invention according to claim 15, wherein the fluid supply passage is a radially extending passage and said fluid control passage is axially extending.

19. The invention according to claim 15, wherein said valve is a ball valve.

20. The invention according to claim 16, wherein said pole piece assembly includes a stamped flux washer member and a press-fit valve seat member.

21. The invention according to claim 15, wherein said bobbin and said coil member are over molded in an integral unit with a connector member.

22. The invention according to claim 15, wherein a cage is formed for retaining the armature therein.

23. The invention according to claim 15, wherein said fluid control body is made of a polymer material.

24. The invention according to claim 15, wherein said fluid control body has an upper radially extending lip member and at least one axially protruding positioning rib extending therefrom.

25. The invention according to claim 15, wherein said fluid control body has a performance curve progression of any of those depicted in any of Figures 9-11.

26. A solenoid fluid control valve, comprising:

a fluid control body adapted for being received in a fluid housing, said fluid control body including a central cavity, and having a pressure supply passage at a first end and a radially extending pressure control passage;

a feed supply tube positioned in said central cavity, said feed supply tube including an outer diameter in communication with the pressure control passage, and including an inner bore operably connected to said pressure supply passage, said feed supply tube being supported in said central cavity of said fluid control body by way of a radially and axially extending wall, said wall being segmented

into a plurality of longitudinally extending flow chambers, said feed supply tube including a valve receiving chamber area;

a valve seat portion being made of a metallic material and press fit into said fluid control body, said valve seat portion including a valve seat and a passage in communication between said valve seat and said pressure control passage;

a valve contained in said valve receiving chamber operable to selectively close off communication between said pressure supply passage and said pressure control passage;

a solenoid for opening said valve in response to a signal, wherein said solenoid includes a central axis and has a coil wound around a bobbin, spaced from and positioned around said central axis, said coil having radially stepped radial inner diameters;

a casing member for attaching said solenoid to said fluid control body; a portion of said casing member extending into the stepped portion of said coil for forming a flux tube therein;

an armature axially movable within said bobbin;

a pole piece assembly adjacent said armature and interposed between said bobbin and said fluid control body; and

a control rod extending along said central axis and through said pole piece assembly for opening of said valve, said control rod including a tapered end.

27. The invention according to claim 26, wherein the fluid supply passage is a radially extending passage and said fluid control passage is axially extending.
28. The invention according to claim 26, wherein said valve is a ball valve.
29. The invention according to claim 26, wherein said pole piece assembly includes a stamped flux washer member and a press-fit valve seat member.
30. The invention according to claim 26, wherein said bobbin and said coil member are over molded in an integral unit with a connector member.
31. The invention according to claim 26, wherein a cage is formed for retaining the armature therein.
32. The invention according to claim 26, wherein said fluid control body is made of a polymer material.
33. The invention according to claim 26, wherein said fluid control body has an upper radially extending lip member and at least one axially protruding positioning rib extending therefrom.
34. The invention according to claim 26, wherein said fluid control body has a performance curve progression of any of those depicted in any of Figures 9-11.